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PRINCE WILLIAM SOUND MANAGEMENT AREA
1992 SHELLFISH ANNUAL MANAGEMENT REPORT

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INTRODUCTION

This report documents the most recently completed shellfish fisheries in the Prince William Sound Management Area (Area E). The Area is comprised of all waters of Prince William Sound and the Gulf of Alaska from Cape Suckling to the east and Cape Fairfield to the west.

The fisheries are: 1992-93 sidestripe shrimp *Pandalopsis dispar* fishery, 1992 weathervane scallop *Patinopecten caurinus* fishery and the spring 1992 Dungeness crab *Cancer magister* fishery. Octopus and squid harvested as bycatch in groundfish fisheries are also reported.

The 1993 Tanner crab and the 1992-93 king crab fisheries remained closed due to low stock abundance. The fall portion of the Dungeness crab fishery was also closed due to low stock abundance and poor recruitment. No commercial effort occurred during 1992 for razor clams although the season was open.

Shellfish landings from directed fisheries in Area E during the past year included 246,243 pounds of trawl shrimp and 208,836 pounds of weathervane scallops. Harvest data from the spring Dungeness crab fishery is confidential. This is because of a department policy on confidentiality which generally states that any time a fishery or statistical area has fewer than three participants, catch information may not be made public. Table 1 lists Emergency Orders affecting area fisheries during 1992.

The estimated ex-vessel value by fishery was $414,000 for trawl shrimp and $831,000 for weathervane scallops.

TANNER CRAB FISHERY

Introduction

The Prince William Sound Management Area Tanner crabs *Chionocetes bairdi* have historically been the primary shellfish resource in terms of landed weight. Over 74 million pounds have been harvested during the past 24 years. Historically, the harvest has been approximately equally divided between the Gulf of Alaska and Prince William Sound (PWS).

The management area is divided into four Tanner crab management districts (Figure 1). The Northern and Hinchinbrook Districts include most of the waters inside PWS proper while the Eastern and Western Districts encompass the Gulf of Alaska portion of the management area and southwestern PWS.

The Tanner crab fishery in PWS is classified as "superexclusive". This term means that a boat validly registered to fish in the PWS registration area may not participate in any other Tanner crab fishery within the state during that registration year. Conversely, a boat validly registered to fish in another registration area may not fish in PWS during that registration year. Other regulations unique to the fishery are a 175-pot limit in Area waters west of 146°40' West longitude. East of this line a 100-pot limit is in effect. The minimum legal size limit for Tanner crab in Area E is 135mm (5.3 in). The fishery regulatory season dates are January 15 - March 31.

Tanner crab fishing began in 1968 when 1.2 million pounds were landed. The fishery peaked during the 1972-73 season when 13.9 million pounds were taken. The entire area experienced decreasing harvests during the late 70's and early 80's. These decreasing harvests preceded large area closures during the 1984 and 1985 seasons and subsequently full area closures from 1988 to 1993 (Appendix A).

There are three reasonable explanations for the decline in abundance of the Prince William Sound Tanner crab stock:

1) the overharvest of immature and mature males and the harvest of females prior to the adoption of the minimum size limit of 5.3 inches in 1976. For example in 1974, 3.8 million pounds were harvested of which 2.7 million pounds were below the current minimum size limit.

2) lengthy seasons also had significant adverse effects on the stocks due to excessive trapping, handling, and lost gear. Seasons from 1974 through 1981 lasted seven months.

3) unfavorable environmental conditions. Warming ocean temperatures may be a contributing factor to the sharp decline and continued low abundance of Tanner crabs in the management area by favoring the production of predators and providing suboptimal environmental conditions for survival of crab larvae.

Following the significant decline in catch from 1979 - 1984 the desire to harvest a buildup of postrecruit crabs prompted a reopening of the Tanner crab fishery in 1986. It is likely that a significant portion of these older postrecruit crabs would have succumbed to natural mortality if not harvested. The harvest for 1986 was 0.53 million pounds and 75% of the crabs taken during that fishery were postrecruits.

The department's 1986 summer pot survey of the Tanner stock indicated that the catchable segment of the population was stable. Increased catches of recruit and prerecruit crabs prompted the department to set the guideline for the 1987 season at 0.5 million pounds.

The 1987 season harvest of 0.57 million pounds was similar to the 1986 harvest, however, recruit crabs comprised one half of the harvest. The increase in the percent recruits is attributed to the removal of old-shell crabs during the 1986 season along with moderate recruitment during 1987.

The department's 1987 summer survey indicated that the abundance of recruit and prerecruit crabs was not increasing, therefore a conservative approach was taken in managing the 1988 fishery. In-season harvest statistics confirmed that recruitment was declining, therefore the harvest was limited to 0.47 million pounds.

During 1988, the annual survey indicated a decline in the legal segment of the stock. The average catch of legal crabs in the Northern and Hinchinbrook Districts decreased from 11.1 crabs/pot in 1987 to 4.1 crabs/pot in 1988. Both recruit and prerecruit abundance also declined to historic survey lows. In conjunction with the decline in survey catch was a coincidental decrease in the stock's geographic distribution. Two areas within Prince William Sound that had moderate catches of Tanner crab during 1986 and 1987 were nearly devoid of crabs during the 1988 survey. This information prompted the department to close the 1989 Tanner crab fishery. The fishery has remained closed through the 1993 season due to continued low stock abundance.

The waters inside of Prince William Sound were the most productive during the 1986-1988 fisheries. More than 90% of the harvest was taken within PWS during these years. This contrasts with the period from 1968 to 1983 when inside waters of PWS contributed approximately 50% of the catch with the Area's Gulf of Alaska waters contributing the balance and illustrates the decrease in the stock's geographic distribution. The recent ten-year average annual harvest for Area E is 0.3 million pounds. This average includes six years when there was no fishery.

In 1990, the department initiated a trawl sampling program for tanner crab to determine whether it was a feasible sampling tool for the waters of Prince William Sound. In 1991 the trawl survey was extended to provide coverage of all traditional tanner index pot survey stations. The pot survey was also continued during these years to provide a basis for comparison between survey techniques.

Results of the 1991 trawl survey indicated that the numbers of true recruit and legal sized crabs was low with estimates of 20,300 and 105,045 respectively. These figures were supported by

the pot survey which yielded an index of 0.1 true recruit and 3.4 legal crabs per pot. Both of these numbers are historic lows for the pot survey which has been ongoing since 1977.

One of the benefits derived by changing from a pot survey to a trawl survey is the ability of trawl gear to sample younger age classes of crab. Trawl gear allows the tracking of these age classes while the pot gear is incapable of capturing and holding crab at these ages because of the large mesh size. This ability provides an indication of upcoming year class strength. For example, results of the 1991 trawl survey showed a relatively strong prerecruit 3 age class. The growth of this age class can be seen in the shift to the right in the 1992 survey length frequency (Figure 2). The department will continue to use the trawl survey to monitor the stock on an annual basis.

Sampling for the occurrence of bitter crab dinoflagellate disease syndrome was accomplished in 1990 and 1991. Bitter crab disease is characterized by poor meat quality, a pink carapace and milky hemolymph. According to department staff in Southeast Alaska, the disease results in 100% mortality of infected crabs. In 1990, 6 of 83 (7%) hemolymph samples submitted to the Alaska Department of Fish & Game Fish Pathology Laboratory in Juneau tested positive. Of the six positive crab, four were oldshell. None of the 79 hemolymph samples submitted in 1991 tested positive. No samples were collected in 1992.

1993 Season Summary

The commercial Tanner crab fishery in the PWS management area remained closed in 1993. Tanner crab in PWS remain in a depressed condition. The 1992 trawl survey indicated an overall stock decrease with estimates of 65,314 legal male crabs and 9,474 true recruits. This is the lowest abundance of legal crabs since the inception of the fishery in 1968.

1994 Management Outlook

Based upon results of the 1992 stock assessment survey, recruitment should improve in 1993. The annual Tanner crab trawl survey yielded population estimates of 65,314 legal males, 9,474 true recruits, and 135,806 true prerecruit-1 crabs. The 1992 true prerecruit-1 estimate is twice the 1991 estimate and should result in increased recruitment in 1993. Nevertheless, skip molting remains a limiting factor in the prerecruit-1 size class where 158,309 (53%) are in an old shell condition. Overall, the estimate of the harvestable portion of the stock decreased by 40 percent in 1992 and the stock remains in a depressed condition.

The propagation of weak year classes is a direct function of diminished reproductive capacity. The reduction in the Tanner stock was largely caused by the overharvest of legal, sublegal and even female crabs during the lengthy seasons of the 1970's. The department plans to maintain maximum reproductive potential to insure recovery when ocean conditions favor shellfish production. In this context the near-term goal is to provide maximum reproductive potential, reduce handling and trapping losses, and when possible allow small fisheries similar to the 1986 through 1988 seasons.

KING CRAB FISHERY

Introduction

Three species of king crabs are found in the Prince William Sound Management Area: Red *Paralithodes camtschaticus*, blue *Paralithodes platypus*, and brown *Lithodes aequispina*. Red king crabs are sparsely distributed throughout PWS with historic concentrations occurring in eastern PWS and Hinchinbrook Entrance. Blue king crabs occur in the Port Wells - Harriman Fjord area with other small isolated pockets associated with glacial fjords in western PWS. Brown king crabs are found in central and western PWS at depths of 150-400 fathoms. Waters

in the Gulf of Alaska portion of the management area have no documented concentrations except for a very sparse distribution of brown king crabs.

The king crab fishery in Area E is designated as superexclusive. The minimum legal carapace width for red and brown king crab is 7 inches (178mm) and for blue king crab 5.9 inches (150mm).

The regulatory season opens throughout Prince William Sound on October 1 and closes on December 20. A second season opens on January 15 and closes by regulation March 15. The split season allows a three-week period when gear must be removed from the fishing grounds and eliminates the preemption of fishing locations prior to the Tanner crab fishery which opens January 15.

The abundance of red king crabs was ascertained during Tanner crab pot surveys. An annual index was conducted 1977-91 to track the red king crab population. Presently red king crab abundance is assessed through catches in the Tanner crab trawl survey. Brown and blue king crab populations are assessed by commercial fishery dockside interviews and size frequency analysis of commercial catch samples.

Catch reporting by species did not begin until the 1979-80 season (Appendix Table 2). The harvest of nearly 300,000 pounds in 1972 is believed to be primarily blue king crab. During the period 1979-1992 the stocks of both blue and red king crab declined. Fisheries for both species remained closed from the 1984-85 season to the 1991-92 season. These closures coincided with the development of the brown king crab fishery. Fishery performance in the brown king crab fishery indicates that the stock of brown crab is small as evidenced by the low effort coupled with declines in average weight, size, and geographic distribution.

The Alaska Board of Fisheries, at the spring 1988 meeting, adopted a guideline harvest range of 40,000 - 60,000 pounds for brown king crab in Area E. This range was adopted to help stabilize the legal segment of the brown king crab stock from declines in average size, weight, and distribution experienced since the fishery began in 1982. In the short term this guideline

may have been established too late since fisheries in '89-90 and '91-92 have not attained even the low end of this harvest range.

The most recent fishery for king crab in PWS occurred in 1991. Fishing for all three species of king crab opened by regulation in the western portion of Prince William Sound on October 1, 1991. Harvest information from the 1991-92 king crab fishery is confidential due to the low number of participants. There were six registrants for the fishery with only two reporting any catch. All three species of king crab were targeted during the season and the catch per unit of effort was very low. The fishery closed by Emergency Order on November 27, 1991.

1992-93 Season Summary

The commercial king crab fishery in PWS remained closed during the 1992-93 season. Fishery performance data from the 1991-92 season demonstrate that the king crab stocks in PWS are severely depressed. These same data provide no indication of impending recruitment to the legal segment of the stock for any of the species known to occur in PWS. The incidental catch of red king crabs during the department's stock assessment efforts in the eastern portion of PWS indicate that this stock remains depressed. The 1992 trawl survey captured 2 immature female red king crab.

1993-94 Management Outlook

The department does not plan to open the king crab fishery for the 1993-94 season. Interviews with participants in the 1991-92 season indicated that the king crab stocks in PWS will remain depressed for several years with brown king crabs the most likely target species in the future. This is based upon reports of very few undersized males and ovigerous females observed during the most recent fishery.

The very low number of red king crab captured in the 1992 trawl survey indicate no change in the depressed status of this stock. Fishery performance data from the 1991-92 fishery also indicated little potential for near term change in this stocks status.

Blue king crab is scheduled to remain closed for the 1993-94 season based on the 1991-92 season fishery performance. Increased recruitment due to immigration is highly unlikely because there is a low probability that this isolated stock is related to other blue king crab populations in Alaska. While fishing during the last regulatory season in 1991-92, fishermen reported very few undersize male and female blue king crabs, therefore, a recovery of the stock is not expected in the near term.

DUNGENESS CRAB FISHERY

Introduction

The Dungeness crab *Cancer magister* fishery in Area E is classified as "superexclusive". Historically, the major Dungeness crab harvests have come from two areas of Prince William Sound: (1) Orca Inlet District and (2) Copper River District (Figure 3). Dungeness crab are also harvested from the Orca Bay portion of the Northern District and from small populations in western Prince William Sound. However, these harvests have been proportionately small (Appendix Table 3).

Northern District

The Northern District harvest has been taken either incidental to the Tanner crab fishery or by one or two vessels targeting on Dungeness crab. It has limited Dungeness crab habitat and a history of low production. For example in the period 1983 to 1992 the average harvest was 735 pounds with effort never exceeding two vessels. These figures include six years when there was no harvest. The Northern District is open year-round. The eastern portion of Orca Bay, which

adjoins Orca Inlet, provides Dungeness crab for both the Orca Inlet and Northern districts. Movement generally occurs from Orca Bay into Orca Inlet during the summer with a return to the deeper waters of Orca Bay in the winter.

Orca Inlet

Orca Inlet, which is immediately adjacent to the community of Cordova, once provided a fishery that allowed participation by small vessels in an area protected from adverse sea conditions. The largest vessels fishing this area were in the 40-foot seiner class. Most vessels made 1-day trips and delivered each fishing day. Harvests have ranged from over a million pounds in the early 1960's to 35,000 pounds in 1976. The limited data available on effort in this district indicates that for the period 1976 to 1979 the number of vessels ranged from 3 to 34 and averaged 23. This district has a 100 pot limit.

The department has conducted an annual survey in the Orca Inlet district since 1977. The District opens September 1 by emergency order only and closes on May 31. The district has remained closed via regulation since 1980. The September opening occurs only if the department survey indicates both an adequate abundance of Dungeness crabs and completion of the annual molt.

The major reason for the continued suppression of the Dungeness crab population in Orca Inlet is predation by the sea otter. The otter arrived in large numbers during 1980 and immediately impacted the Dungeness crab stock. A sea otter predator/prey relationship study conducted in the late 1970's showed that when Dungeness crabs are available, an otter is capable of eating 10 crabs per day.

Copper River District

The Copper River District fishery, which has a 250-pot limit, is a spring and fall fishery due to a regulatory closure for soft shell crabs during the summer months. For the ten year period 1983-1992 the average catch and effort were approximately 590,000 pounds and 11 vessels. This area is not sheltered from the Gulf of Alaska and the longer running distance to market

generally requires larger vessels. Prior to 1987, fishing during the molting period was regulated entirely by emergency order. Beginning in 1987, split regulatory seasons were implemented in the Copper River District with fishing dates from March 20 to May 20 and July 25 to December 31. The regulatory closure extends from May 20 to July 25 and is designed to protect the stock from handling mortality during the softshell period following the annual molt. Additionally, the Controller Bay area closes on October 15. This early closure is designed to reduce gear loss from storms in this area of shallow water.

The July 25 opening was delayed via emergency order in 1987, 1988, 1990 and 1991 until the crabs had attained an acceptable shell hardness. The opening date in 1987 was August 20, in 1988 September 15, in 1990 August 19 and in 1991 the district opened on August 28.

The spring season harvest in the Copper River District is typically comprised of old shell crabs, such as post recruits or late season recruits from the prior year's molt. The majority of the fall season harvest is generally comprised of recruit crabs although the proportion is dependent upon the post recruit catch during the Spring season and the magnitude of the current-year recruitment event.

The trend of declining harvests of Dungeness crabs from the Copper River District began in 1986. At 70,259 pounds the 1991 harvest was the historical low for the fishery. Effort was above the ten year average for both the 1990 and 1991 seasons.

1992 Season Summary

Northern District

One boat was registered to fish in the Northern district in 1992, thereby making the catch confidential. The district was open for the entire year.

Orca Inlet District

The season was not opened in 1992. There are few males of any size remaining on the grounds. The abundance of male crabs is not expected to increase in the near future. The annual Orca Inlet survey yielded 25 sublegal males and 9 females. Pot bycatch was dominated by yellowfin sole and sea stars.

Emergency order closures have been in effect for the subsistence fishery since September 1981, and the personal use fishery since 1988.

Copper River District

In 1992, the catch from the Copper River District accounted for all of the Area total, however, catches are confidential due to low participation (n=1). The spring season opened by regulation on March 20 and continued through May 20. The department's soft shell survey in both July and August indicated low recruitment. Catch per pot of legal crabs averaged one for both surveys. Due to poor recruitment and the low survey CPUE, Dungeness fishing in the Copper River District closed by emergency order on August 24, 1991. Because there would be no opportunity for growth in the recruit and prerecruit-1 age classes until the following summer, the earliest date for reopening was set for July 25, 1993.

1993 Management Outlook

The Northern district will remain open year-round.

Orca Inlet will continue to be surveyed; however, a recovery is not anticipated as the sea otter population does not appear to be declining. The department's annual survey in the Inlet also indicated that a fishery in the near term is not likely.

The department plans to monitor the summer molt by conducting a soft shell survey prior to the fall season regulatory opening date of July 25, 1993. If the molting period is prolonged, an emergency order will be issued to delay the fishery opening and the department will conduct an additional survey. If department surveys detect another weak recruitment event and CPUE remains low, the fishery will likely remain closed.

POT SHRIMP FISHERY

Introduction

The Prince William Sound pot shrimp fishery targets on spot shrimp *Pandalus platyceros* and to a limited extent coonstripe shrimp *Pandalus hypsinotus*. The commercial fishery was first documented in 1960 when 4,100 pounds were harvested. From 1960 until 1977, landings varied from no reported harvest in 1962 and 1966 to a high of 20,000 pounds in 1974 (Appendix Tables 4 and 5).

The pot shrimp fishery expanded rapidly after 1978 with increases in both catch and participants. Growth of the fishery was greatest from 1978 through 1982. During this period local markets were established and the major harvesting areas located. Landings increased from 12,000 pounds in 1978 to 178,000 pounds in 1982. Similarly, effort increased from 9 to 57 vessels during this period. Harvests were stable from 1982 through 1984 due to a management strategy which employed the following:

1) Elimination of year-round fishing, and seasons set to avoid fishing during peak egg bearing periods.

2) Establishment of a guideline harvest range based upon historical harvests.

In September of 1984 the Alaska Board of Fisheries established three fishing areas with a management plan for each one. These areas were: Traditional Harvest Area, Montague Strait Experimental Harvest Area (MSEHA), and the Eastern Harvest Area.

The department has managed the pot shrimp fishery in PWS under the plans established by the Board of Fisheries from 1985 through mid-1990. During the spring 1990 Shellfish Board of Fisheries meeting, the Board adopted a proposal submitted by the department to eliminate the MSEHA and combine these waters into the Traditional Harvest Area (Figure 4). The MSEHA was established as an experiment to determine if continuous fishing would depress the shrimp stock. However, due to continuous fishing from 1985 - 1988 a stock conservation problem developed. Catches declined in the MSEHA from approximately 46,500 pounds in 1986 to 2,000 pounds in 1988. The department closed this area in October 1988 and in 1990 the Board of Fisheries eliminated the MSEHA and incorporated these waters into the Traditional Harvest Area.

The Board of Fisheries also adopted two new gear related proposals during the March 1990 Board meeting. The first regulation placed a limit of 150 pots per vessel. The second regulation was intended to provide protection to small, nonsalable size shrimp by requiring rigid 7/8" mesh which would allow these shrimp to escape. Pots with a definable side must have at least two adjacent sides completely composed of the rigid mesh. Round pots must have rigid mesh covering a minimum of 50% of the vertical surface area of the pot.

Two regulatory fishing seasons occur per calendar year in the Traditional Area. The spring season opening date was changed by the Board of Fisheries during the 1990 Board meeting. The spring season now opens on May 1 rather than March 15. The justification for delaying the season opening was a desire to avoid harvest during the egg release period. The spring season closes on June 30. The fall season begins on August 15 and continues until December 15. The annual guideline harvest range is 150,000 - 200,000 pounds split evenly between the two seasons. Either season may be closed earlier by emergency order if the harvest level is

achieved. When excessive harvest occurs during the spring season the poundage is deducted from the fall season.

The majority of pot shrimp landed are caught in the northern and western portions of Prince William Sound (Traditional Harvest Area) which are characterized by numerous steeply cut glacial fjords and passages. This area encompasses the northern shore from Port Valdez to Whittier and all of western and southwestern PWS including Montague Strait (Figure 4). Market access is through the ports of Whittier, Valdez and Seward, which have direct transportation ties with the Anchorage metropolitan area. This accessibility has been the key to development of fresh markets for unprocessed spot shrimp because the product can be utilized shortly after capture.

The Prince William Sound pot shrimp fishery is unique in that participants vary from full-time to seasonal and weekend fishermen. This heterogeneous mix has split the industry as to the desired season of harvest.

The Eastern District has a very low production history and is designated as a year-round fishery. Harvests in this District have averaged less than 1,000 pounds. Due to low effort, catches are held confidential. A Commissioner's permit is required for this area to allow the monitoring of effort and catch.

The department began a survey of spot shrimp in the THA with a goal of ascertaining the overall health of spot shrimp stocks. Pots are set in the northern, western, and southwestern portions of PWS. Six stations have been surveyed annually since 1989 with two experimental stations added in 1991. Data from the survey, specifically CPUE and sex ratios are used in making management decisions regarding the fishery.

The 1991 fall spot shrimp fishery in the Traditional Harvest Area provided the most recent opportunity for fishing. The fishery opened late, September 10, by emergency order to avoid

gear conflicts with the salmon seine fleet and to provide shrimp fishermen an opportunity to participate in the commercial halibut fishery in early September.

The total annual harvest from Prince William Sound declined rapidly from 290,632 pounds in 1988 to 29,315 pounds in 1989 and 36,737 in 1990. The department's intent in allowing a fishery during the fall of 1991 was to provide an area-wide indication of the stock condition as well as substantiate the department survey and available growth data. A small fishery would allow both the fishing fleet and the department to evaluate commercial catches of shrimp after a short period of reduced harvests.

The preseason guideline harvest range (GHR) set by the department was 10,000 to 40,000 pounds whole weight. This GHR was reduced from the regulatory guideline of 75,000 - 100,000 pounds established in the Prince William Sound Management Plan in 1985. The reduction was in response to fishery performance in the partial area openings of 1989 and 1990 as well as the department's survey information which indicated that the stock was depressed and the number of spawning females low. The survey, however, also showed a moderate year class of males which had the potential to recruit into the fishery in 1991.

The department applied four criteria in determining the point at which the fishery would close within the 10,000 to 40,000 pound GHR.

1. Catch per unit of effort over that observed during the Spring 1990 fishery.
2. Growth and subsequent recruitment of the male segment of the stock into transitionals and females.
3. In-season management information via fish tickets accompanied by logbooks or personal contact with the department.
4. Accurate and timely catch reporting.

The 1991 commercial harvest of pot shrimp in the Prince William Sound Management Area was 17,580 pounds (whole shrimp weight). The harvest by species was 17,302 pounds of spot shrimp and 278 pounds of coonstripe shrimp. The harvest was taken by 15 vessels which made

45 landings. All but a very small percentage of the catch was taken in the Traditional Harvest Area. Catch and effort data from the Eastern District are confidential due to the low number of participants.

In applying the aforementioned four criteria to set the ultimate harvest level, the department utilized logbook and fish ticket data to determine that there was no improvement in catch-per-unit-of-effort (CPUE) between the spring 1990 and the fall 1991 fishery. The overall CPUE from the department's fall 1990 survey and the 1991 commercial fishery were comparable at 0.86 and 0.83 pounds of whole shrimp per pot (Table 2). Furthermore, although the relative numbers of females appeared to have increased indicating that some of the growth potential between year classes was realized, the overall weight of the per-pot catch remained low.

Participation in the voluntary logbook program was exceptional with 65% of the fishermen participating. These logbook data indicated that the harvest was representative of stock condition because fishing effort was distributed throughout the Traditional Harvest Area. The logbook data coupled with the department's survey data indicated that the stock remained depressed, and the fishery closed by emergency order on October 25, 1991.

Ex-vessel value of pot shrimp varies with the species, count of shrimp tails per pound and marketing strategy. A greater value is placed on the larger shrimp. Ex-vessel values for 1991 ranged from $3.50/pound - $10.00/pound for tails. The average price/pound whole weight was $3.23 and the fishery was worth approximately $57,000 to the fishermen.

1992 Season Summary

The commercial spot shrimp season was closed in the THA through the 1992 season due to low abundance. Fishery performance data from the 1991 fishery indicated that the stock remained in a depressed condition. These data were also supported by the department's November 1991

spot shrimp survey in which the CPUE averaged 1.3 pounds of whole shrimp per pot. Although this figure indicates improvement in the depressed condition of the stock, catches of females and shrimp in the salable size range remained low.

The Eastern district remained open to harvest through 1992, however, no harvest occurred.

1993 Management Outlook

Traditional Harvest Area

The October 1992 spot shrimp survey showed a decline in the abundance of adult spot shrimp with a CPUE of 0.8 pounds of whole shrimp per pot (Table 2). Survey catches of spot shrimp at experimental stations in southwestern PWS declined as well with CPUE dropping from 1.2 in 1991 to 0.6 in 1992 (Table 3). It is apparent that a conservative management approach for the immediate future is warranted for the following reasons:

1) The number of female and large male shrimp is low. If a fishery is permitted, these shrimp will be targeted as salable and the abundance of this size range will decline further thereby reducing the brood stock and increasing the risk of future recruitment failure.

2) The spot shrimp fishery has accelerated rapidly over the past ten years. Department surveys and recent declines in commercial harvests suggest that the harvest has exceeded the replacement rate.

3) Spot shrimp are long lived and slow growing further emphasizing the need to keep fishing mortalities at or below the level of replacement. If harvests exceed the level of replacement, the stocks decline, the fishery remains closed, and slow growing spot shrimp will require many years to recover.

4) The dramatic decline in spot shrimp harvests since 1988 is reflective of the condition of spot shrimp stocks throughout PWS.

Spot shrimp growth data from a tagging study in Prince William Sound indicated that growth is approximately 10% of the carapace length/year. This slow growth is confirmed by the shift in size frequencies seen in Figure 5 which compares the size frequency of spot shrimp from department surveys in Prince William Sound from November 1989 - 1992. The mode indicated by the large number of males caught during the fall of 1989 continues to shift slightly to the right during ensuing annual surveys.

Eastern Prince William Sound

The department plans to allow year-round fishing in this area during 1993. Production remains low and it appears that no significant quantities of spot shrimp exist, however, the opportunity for exploratory fishing will remain. All shrimp harvests in this district have occurred within PWS. The Gulf of Alaska portion of this area does not provide the habitat required for spot shrimp.

TRAWL SHRIMP FISHERY

Introduction

Emphasis in the trawl shrimp fishery has shifted from the harvest of pink shrimp *Pandalus borealis* in southwestern Prince William Sound to sidestripe shrimp *Pandalopsis dispar* in northwestern PWS (Figure 6). Large Kodiak based vessels that harvested pink shrimp in southwestern PWS constituted the main effort during the early 1980's. The fishery for pink shrimp declined due to the low ex-vessel value of pink shrimp, limited processing capabilities and poor pink shrimp stock conditions (Appendix Table 6).

The first documented harvests of sidestripe shrimp occurred in 1983 around the Icy Bay area, however, recent activity has focused on northwestern PWS. Increased harvests of sidestripe shrimp began in 1985. The reason for the sudden expansion was the development of markets

and gear by fishermen with small vessels, targeting on stocks which were previously unfished. Sidestripe tails are marketed fresh in Anchorage while markets for whole, fresh and frozen sidestripes exist in both Anchorage and Japan.

During the period when the trawl fishery for pink shrimp was fully developed catches ranged from 171,000 pounds to 1.3 million pounds and effort ranged from 3 to 14 vessels. Since sidestripe shrimp became the predominant species of harvest in 1987, catch and effort have ranged from 96,000 pounds to 246,000 pounds and 2 to 5 vessels respectively. The incidental harvest of pink shrimp during this same period ranged from 275 to 3,500 pounds.

As catch and effort increased, the department became concerned for the conservation of the sidestripe shrimp resource in Port Wells. In April 1990 the department initiated a program utilizing onboard observers data to calculate an area-swept estimate of trawlable shrimp abundance for the Port Wells area. A 20% harvest rate was applied to the estimate. In 1990 and 1991 this method yielded harvest levels of 44,000 and 80,000 pounds, respectively. The Port Wells area closed to commercial fishing during the second half of the 1990 regulatory season and on June 23 in 1991 due to attainment of the harvest level.

At the spring 1986 shellfish meeting the Board of Fisheries (BOF) established a fishing season of March 1 through November 30 for sidestripe shrimp fishing in northwestern Prince William Sound. Subsequently in 1990, the Board adopted a season of April 1 through August 15 and September 15 through December 31. The opening date was changed to delay fishing in the spring to allow for completion of the egg release. The closure from August 16 through September 14 was proposed by a fishermen who indicated to the Board that soft-shell shrimp were prevalent in the catch during that time. The season was extended to December 31 to enable fishermen to provide shrimp for holiday markets.

In summary the regulatory measures for trawl shrimp are:

1) April 1 - August 15 and September 15 - December 31 season dates in the Northwestern area

2) Cod end mesh restriction during the entire season in the Northwestern area. Cod ends must be at least 15 feet in length with at least 12 feet composed of 1 7/8 inch stretched mesh hung horizontal and perpendicular to the mouth of the trawl.

3) No more than 10% by weight of the shrimp in possession may be pink shrimp in the Northwestern area.

4) A year-round closure in the eastern Prince William Sound (Port Fidalgo, Orca Bay and Hinchinbrook Entrance) to minimize non directed fishing mortality on king crab and Tanner crab stocks in these key production areas.

5) May 1 - February 28 in both the Icy Bay district and the central/southwest portions of PWS.

6) A 250,000 - 600,000 pound guideline harvest range for the Icy Bay District, which is in southwestern PWS.

7) A June through August season in the Northern Herring Fishing District to avoid conflict with herring season closures.

1992 Season Summary

The trawl shrimp harvest in Prince William Sound for 1992 was 246,243 pounds of whole shrimp by 5 vessels in 70 landings. This is the historical high harvest for the fishery since it began targeting sidestripes in 1985. Sidestripe shrimp dominated the landings with 196,467 pounds (Table 3). Incidental landings of pink shrimp and other miscellaneous shrimp equalled 651 pounds. Approximately 49,100 pounds of deadloss (pink shrimp, crushed sidestripes) were reported on fish tickets. This marks the third season in which deadloss was reported.

Trawl shrimp landings occurred in February, April through August and October through December. The average ex-vessel value for trawl-caught shrimp was $2.17 per pound, whole shrimp weight. The ex-vessel fishery value was approximately $414,000.

The sidestripe shrimp season in northwestern PWS opened by regulation on April 1, 1991 and remained open through the first half of the regulatory season except for the Port Wells area, which closed by emergency order on June 3, 1992 for the remainder of the year. The closure was prompted by the achievement of the 65,000 pound harvest level set for the area.

Similar to 1991 the department collected onboard observer data in April 1992 during the commercial fishery. A biomass estimate, using area-swept data collected from a commercial vessel, was established for all *Pandalid* shrimp in the Port Wells area and a 20% harvest rate was applied to this estimate yielding a 65,000 pound quota. Commercial samples indicated that the catch was composed of 71% males, 15% females, and 14% transitionals (Figure 7).

1993 Management Outlook

The department will continue to manage the sidestripe trawl fishery using a 20% harvest rate. This will be based on an area-swept population estimate calculated by staff aboard a commercial vessel. Additionally, the department plans to continue collecting in-season fishery performance data. Information on pounds/hour towed, species composition, soft-shell periods, egg bearing and release times are important stock parameters that can be gained through the effort and cooperation of the participants.

Fishery performance data indicate that the sidestripe stock in the Port Wells portion of the Northwest area has declined from earlier years. Onboard observations in 1992 indicated that catch per hour towed was almost half of that recorded in 1991. As a result there is a strong likelihood of a reduced harvest level in 1993. At the current level of effort, the guideline

harvest level will be attained early, prompting an early closure similar to the past two seasons. An early closure will place additional harvest pressure on nearby locations of lower sidestripe abundance but should also function to disperse effort so that new areas of harvest are developed. The department will continue to collect catch and effort data from these areas.

Due to low ex-vessel value and limited abundance no fishery targeting on pink shrimp is expected in southwestern PWS in 1992.

RAZOR CLAM FISHERY

Introduction

Beginning in 1916 and continuing into the mid 1950's, Cordova was known as the "razor clam capital of the world". Historical fishery statistics are imprecise, however, it appears that the majority of razor clams *Siliqua patula* were harvested from Orca Inlet and the western Copper River Delta (Figure 8). The eastern Copper River Delta, which includes Kanak Island, was not a substantial contributor to the early harvests. Catches during this time ranged from 3.6 million pounds in 1917 to a frequent harvest of over one million pounds. Most of the product was canned and ultimately used for human consumption.

The razor clam industry began to decline in the 1950's for a number of reasons:

1) economic - the east coast clam fishery gained economic dominance
2) biological - substrate change caused largely by alteration in the Copper River outflow that severely affected juvenile survival,
3) and possible overharvest by the commercial fishery.

The "Good Friday Earthquake" in 1964 caused significant uplift in prime razor clam habitat in Orca Inlet. Loss of habitat resulted in record low harvests in the 70's and early 80's (Appendix

Table 7). The majority of the production since the mid-70's has come from the eastern Copper River Delta which includes Kanak Island.

In the late 50's and early 60's, commercial demand for razor clams shifted from human consumption to Dungeness crab bait. The demand for razor clams for human consumption increased again in 1983. A decline in clam abundance in Washington led to an expanded fishery in Prince William Sound. Since 1983 the majority of the clam harvest has been taken at Kanak Island beach with minor amounts coming from Softuk and Katalla beaches on the eastern Delta. Yearly harvests during the 1980's attained a maximum of 170,000 pounds with a recent ten year (1981 - 1990) average annual harvest of 45,000 pounds and an average of 16 diggers.

The department monitors commercial razor clam harvests via fish ticket information. The non-commercial harvest is monitored through a permit system which requires a harvest report. A guideline harvest range of 100,000 to 150,000 pounds is in effect for the combined commercial and sport/subsistence harvests from Kanak Island. The minimum legal size of clams is 114mm. (4.5 in.) in length.

By regulation, clams harvested from Kanak Island must be used for human consumption as food. Kanak beach receives annual certification by the Alaska Department of Environmental Conservation (ADEC). Certification allows bivalves to be sold for human consumption. Kanak beach was inspected and certified in June of 1992.

Although Kanak Island is designated for human consumption, the department has difficulty enforcing this regulation. Sand bars near Kanak, that are exposed at low or minus tides, have been the source of bait clams. For enforcement purposes, the department has defined Kanak Island as all tidelands that have a physical land connection with Kanak Island during any tide stage.

1992 Season Summary

There was no commercial harvest in 1992. The last year of documented commercial harvest was was 1989. Reports from non-commercial diggers indicate that the number of legal size animals is low at all beaches in the area.

The reported non-commercial harvest (subsistence, sport and personal use) during 1992 was 2,379 pounds. The department issued 92 non-commercial permits for the Copper River Delta of which 75 responded with a catch report. Harvest from Kanak Island was 1,782 pounds, Katalla beach 249 pounds, Softuk bar 345 pounds, and Grass Island 3 pounds.

1993 Management Outlook

Ex-vessel value of razor clams has not substantially increased for several years. Bait and food clams command a similar price per pound. The local bait clam market has been poor since 1991 due to the depressed Dungeness stocks on the Copper River Delta. Unless an increased demand for food clams occurs, the harvest will remain well below the guideline harvest range of 100,000 to 150,000 pounds set for the beach at Kanak Island. If effort increases at Kanak Island the department will monitor the beach via catch per unit of effort data.

Although the department does not conduct population estimates, reports from non-commercial diggers indicate that razor clam abundance has declined over the previous five years on the eastern delta. Non-commercial diggers with many years experience on the Delta have reported a lack of razor clams on Katalla Beach as well. There is public speculation that since Kanak Island was designated as a food only beach in 1985, effort subsequently increased for bait clams at Katalla Beach contributing to the low abundance.

WEATHERVANE SCALLOP FISHERY

Introduction

A fishery for weathervane scallops *Patinopecten caurinus* developed in the PWS management area in 1992. Although landings have occurred from the adjacent area (D) to the east since the late 1960's, the 1992 harvest constitutes the first documented commercial scallop landings from Area E.

Historically scallop harvests have occurred in the Kodiak and Yakutat areas with each contributing approximately 2/3 and 1/3 of the total poundage. Effort and catch have been erratic since the inception of the fishery, ranging from 19 vessels and 1.8 million pounds in 1968 to no effort in 1978. Since 1988 effort and harvests have increased from 4 to 10 vessels and .3 to over 1 million pounds respectively. The increase in effort is primarily attributable to vessels displaced from scallop fisheries on the east coast of the U.S. With the most recent trend of increasing harvests effort has shifted to new areas.

Statewide management of the scallop fishery stipulates the use of scallop dredges only, ring size restriction, and a commissioner's permit. Area concerns over crab bycatch have led to the designation of closed waters by both area management staff and the Board of Fisheries.

The commissioner's permit required to fish scallops in Area E contained the following stipulations for the 1992 fishery registrants:

1) open waters only south of 60°00 N. lat., bounded on the east by the longitude of Cape Suckling and the west by longitude 147°00 W. long. (Figure 9)
2) One month permit duration with renewal pending permit compliance
3) Fishing log with location, poundage, and meat count per pound
4) Weekly catch report by location and poundage

1992 Season Summary

The 1992 harvest of weathervane scallops in the PWS management area totalled 208,836 pounds of meats taken by 4 boats (Table 4). This poundage equates to approximately 2.1 million pounds whole scallop weight. Harvest occurred from two statistical areas (202-09 and 202-10) in the Kayak Island vicinity (Table 4). Vessels ranged from 74' to 147'in length and towed two 15' New Bedford style dredges. Participants delivered both fresh and frozen product. The average price was $3.98 per pound making the fishery worth approximately $831,000. Fishing began in late February and closed by emergency order on April 23. The closure was based upon an allowable harvest of 64,000 pounds meat weight established by developing an area swept scallop biomass estimate using fishery performance data and applying a 10% harvest rate. This harvest rate is identical to that specified by the Board of Fisheries for the Cook Inlet scallop fishery.

The discrepancy between allowable and actual harvest is directly attributable to a lack of timely and accurate catch reporting and information on scallop stocks in Area E. As the fishery progressed both effort and the geographic area fished increased. Information gathering was difficult because the majority of landings occurred at a port with no department staffing. Collection of data inseason was accomplished by weekly reports of estimated catch, however, actual catch by each vessel was not ascertained until the time of landing. Any error in reporting estimated catch was not evident in some cases for up to 2 weeks. The time delay was attributable to fishing trip length and the time necessary for a fish ticket to arrive via mail. By the time that a picture had emerged of scallop stock distribution and density and the fishery closure announced on April 20, the harvest had progressed to an estimated 150,000 pounds. When the fishery closed three days later the harvest was approximately 209,000 pounds meat weight.

After the eastern Gulf portion of the management area closed, participants expressed an interest in exploratory fishing in the western Gulf portion of the area. This area is delineated on the east by 147°00 W. longitude, on the north by the latitude of Cape Cleare (59°45'45" N latitude.) and on the west by the longitude of Cape Fairfield (148°50' W long.). Waters of PWS and nearshore Gulf waters remained closed to scallop dredging due to department concerns for depressed Tanner and Dungeness crab stocks. Effort in the western Gulf portion of the management area was low with only two participants.

1993 Management Outlook

Fishing in 1992 indicated that the PWS area scallop stock is confined to two relatively small areas. Experimental fishing in the western Gulf of Alaska portion of the management area yielded no indication of a commercial scallop resource. The harvest level for the PWS management area will be close to the 64,000 pound allowable harvest calculated for 1992. Effort for scallops appears to be increasing statewide, therefore, it is reasonable to expect the PWS fishery to experience a similar increase. Given the current allowable harvest level, any increase in effort will likely result in a fishery of very short duration.

MISCELLANEOUS SHELLFISH

Squid and Octopus

Small quantities of squid were landed during commercial shrimp trawl fisheries. Due to the small number of participants (n=2) the harvest information is confidential. Octopus are harvested incidentally to the longline and pot groundfish fisheries. In 1992 the harvest of octopus totalled 5,191 pounds by 26 vessels.

Table 1. Shellfish Emergency Orders, Prince William Sound Management Area, 1992–93.

Fishery	Emergency Order #	Effective Date	Explanation
Tanner	2–S–E–01–93	01/15/93	Commercial – Closed the entire management area to Tanner crab fishing due to low stock abundance.
	2–S–E–02–93	01/11/93	Personal Use – Closed northern Montague Hinchinbrook entrance and Orca Bay due to low stock abundance.
	2–S–E–03–93	01/11/93	Subsistence – Closed northern Montague Hinchinbrook entrance and Orca Bay due to low stock abundance.
King	2–S–E–09–92	10/01/92	Commercial – Closed entire management area due to low abundance.
	2–S–E–10–92	10/30/92	Personal Use – Closed northern Montague, Hinchinbrook Entrance, and Orca Bay to subsistence king crab fishing due to low stock abundance.
	2–S–E–11–92	10/30/92	Subsistence – Closed northern Montague, Hinchinbrook Entrance, and Orca Bay to subsistence king crab fishing due to low stock abundance.
Dungeness	2–S–E–07–92	07/25/92	Commercial – Delayed opening of the Copper River District due to suspected late molt and depressed stock.
	2–S–E–08–92	08/24/92	Commercial – Closed the Copper River District until July 25, 1993 due to low stock abundance.
Pot Shrimp	2–S–E–04–92	05/01/92	Commercial – Closed the western side of Prince William Sound (formerly Traditional Harvest Area) to fishing for the 1992 season.
	2–S–E–11–91	10/25/91	Commercial – Closed the western side of Prince William Sound, lower end of guideline harvest range achieved.
Trawl Shrimp	2–S–E–06–92	06/03/92	Commercial – Closed the Port Wells area due to attainment of guideline harvest level.
	2–S–E–04–91	07/04/91	Commercial– Ammended EO# 2–S–E–03–91 by opening Passage Canal, Blackstone and Cochrane Bays.
Scallop	2–S–E–05–92	04/23/92	Commercial – Closed all waters of management area except western Gulf south of Cape Cleare and west of 147 W. long.

Table 2. Traditional station catch statistics from the PWS spot shrimp surveys, 1989 – 1992.

Year	1989	1990	1991	1992
Number of pots	132	197	194	261
Number of pounds	170	176.8	259.8	202.1
Mean weight per pot (lb)	1.3	0.9	1.3	0.8
Number of shrimp	5192	4283	5964	3750
Mean # shrimp per pot	39	22	31	14
Number of males	4958 (95.5%)	3910 (91.3%)	5535 (92.8%)	3263 (87%)
Number of females	234 (4.5%)	373 (8.7%)	429 (7.2%)	488 (13%)
Number of ovigerous females	213	343	324	408
Mean size males (mm)	27.7	29.3	30.5	31.7
Mean size females (mm)	41.3	41.9	41.3	41.9

Table 3. Experimental station catch statistics from the PWS spot shrimp surveys, 1991 – 1992.

Year	1991	1992
Number of pots	11	110
Number of pounds	1.2	70.4
Mean weight per pot (lb)	0.1	0.6
Number of shrimp	25	1233
Mean # shrimp per pot	2	11
Number of males	24 (96%)	1085 (88%)
Number of females	1 (4%)	148 (12%)
Number of ovigerous females	1	147
Mean size males (mm)	31.4	33.0
Mean size females (mm)	40.4	43.0

Table 4. 1992 Commercial Trawl Shrimp Catch by Statistical Area.

Statistical Area	Number of Vessels	Total Pounds
201–01	*	*
201–02	*	*
201–05	*	*
203–00	*	*
203–01	*	*
203–03	4	20,546
203–04	*	*
203–05	*	*
203–06	*	*
203–07	*	*
Total	5	246,243

Table 5. 1992 Commercial Scallop Catch by Statistical Area.*

Statistical Area	Number of Vessels	Total Pounds
202–09	*	*
202–10	*	*
Total	4	208,836

(*) Catch data is confidential due to the small number of participants.

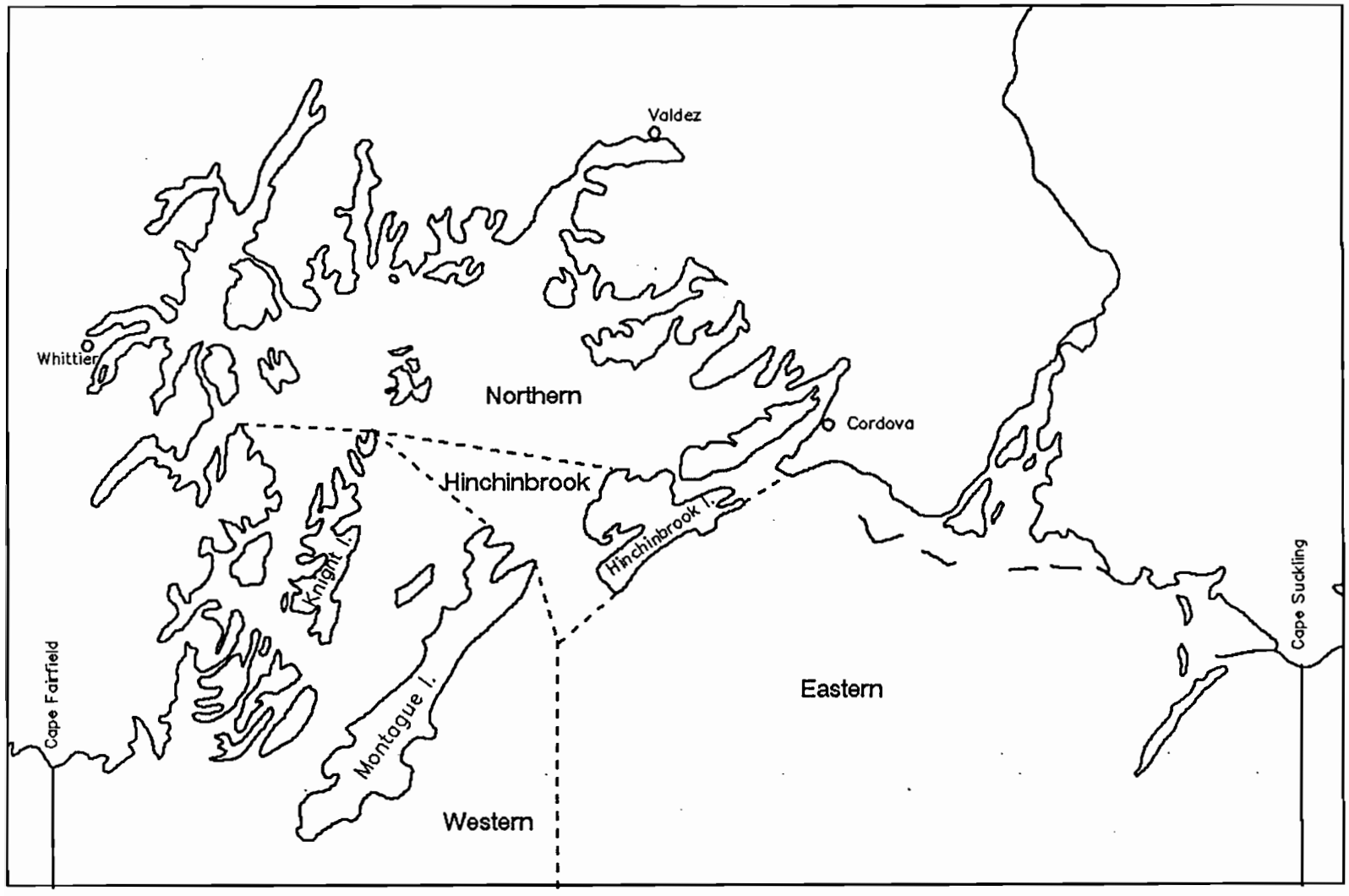

Figure 1. Prince William Sound Tanner Crab Fishing Districts.

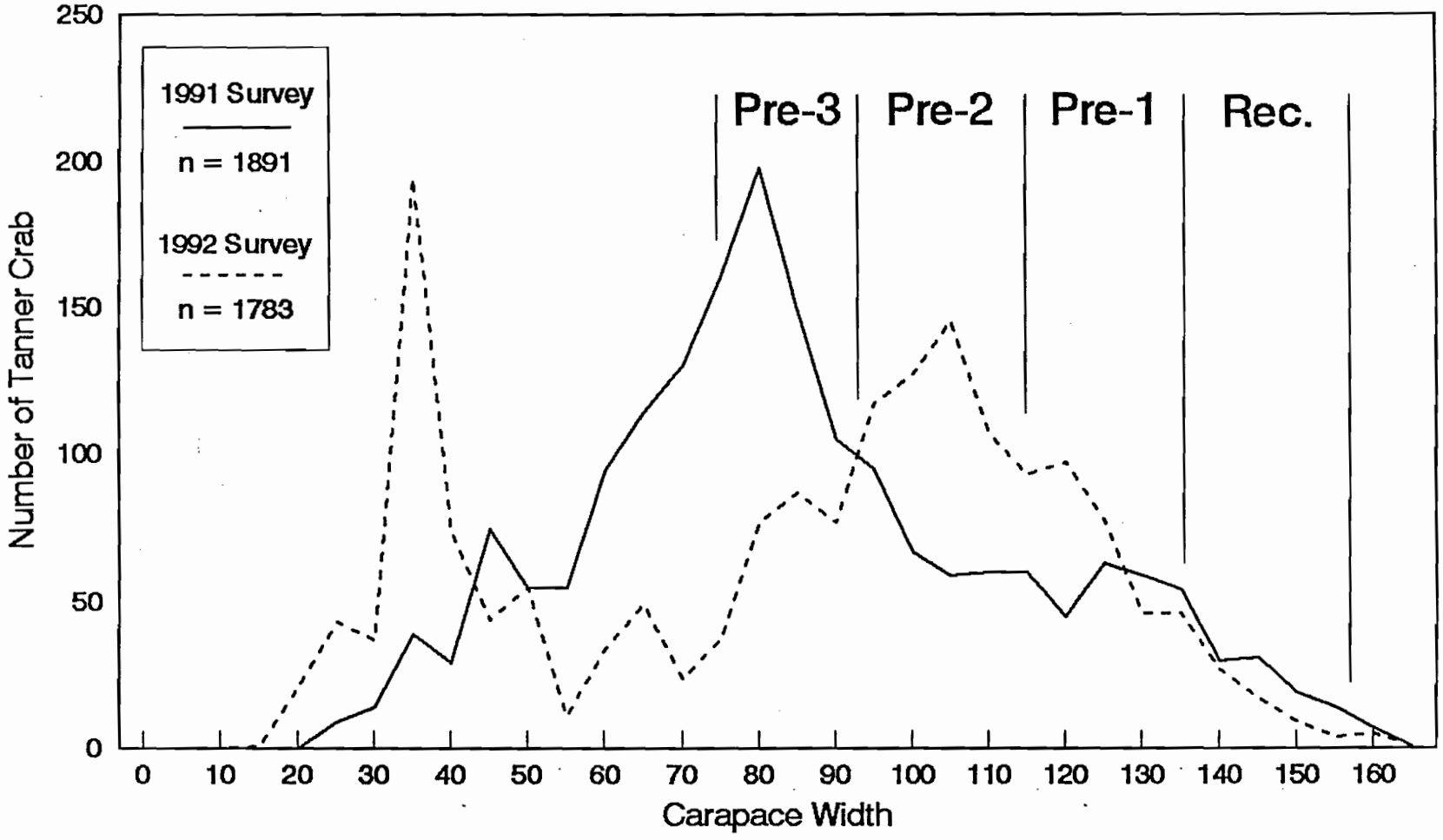

Figure 2. Length frequency of male Tanner crabs from Northern and Hinchinbrook Districts, 1991 - 92 PWS trawl surveys.

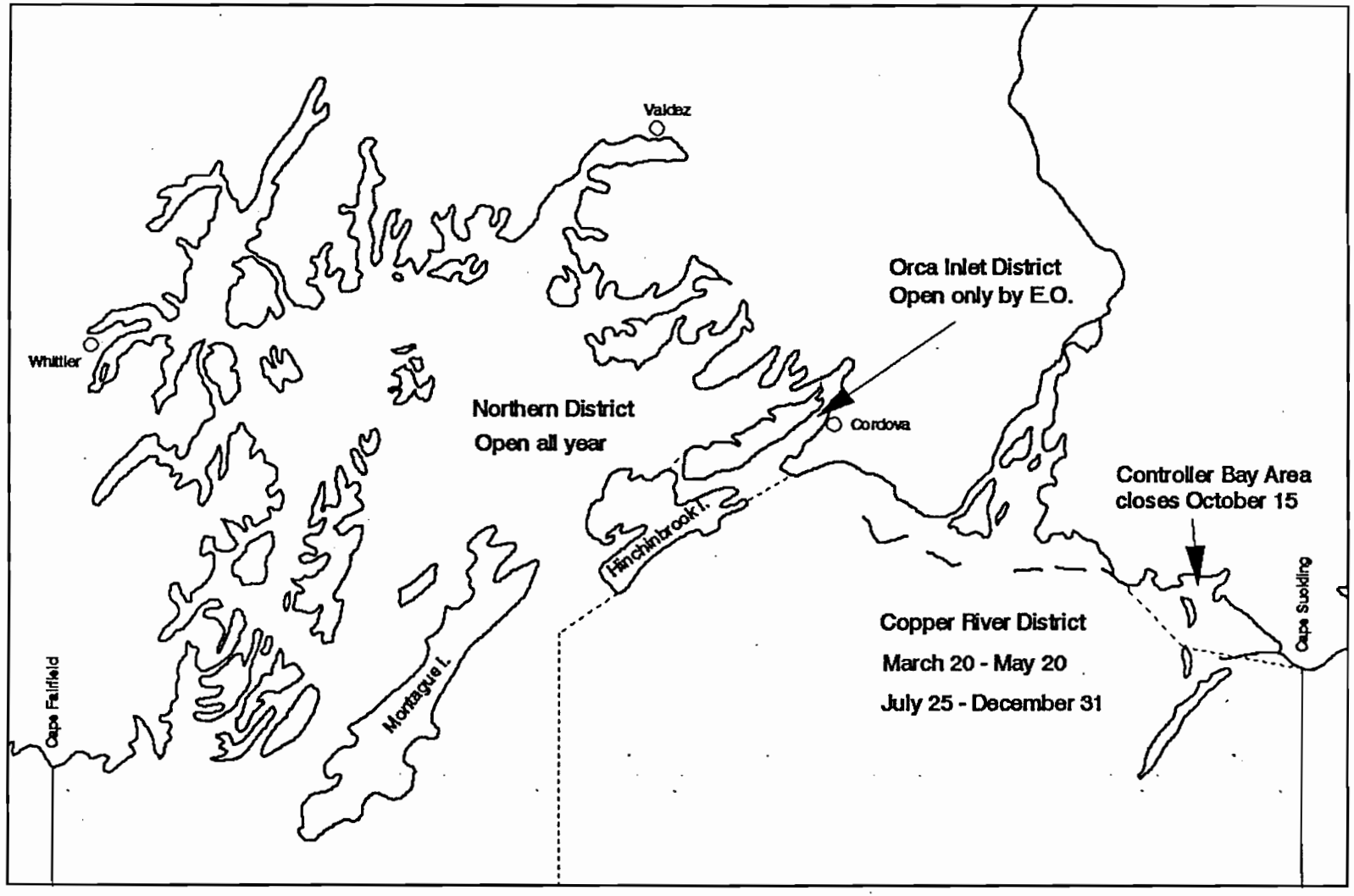

Figure 3. Prince William Sound Dungeness fishing seasons and districts.

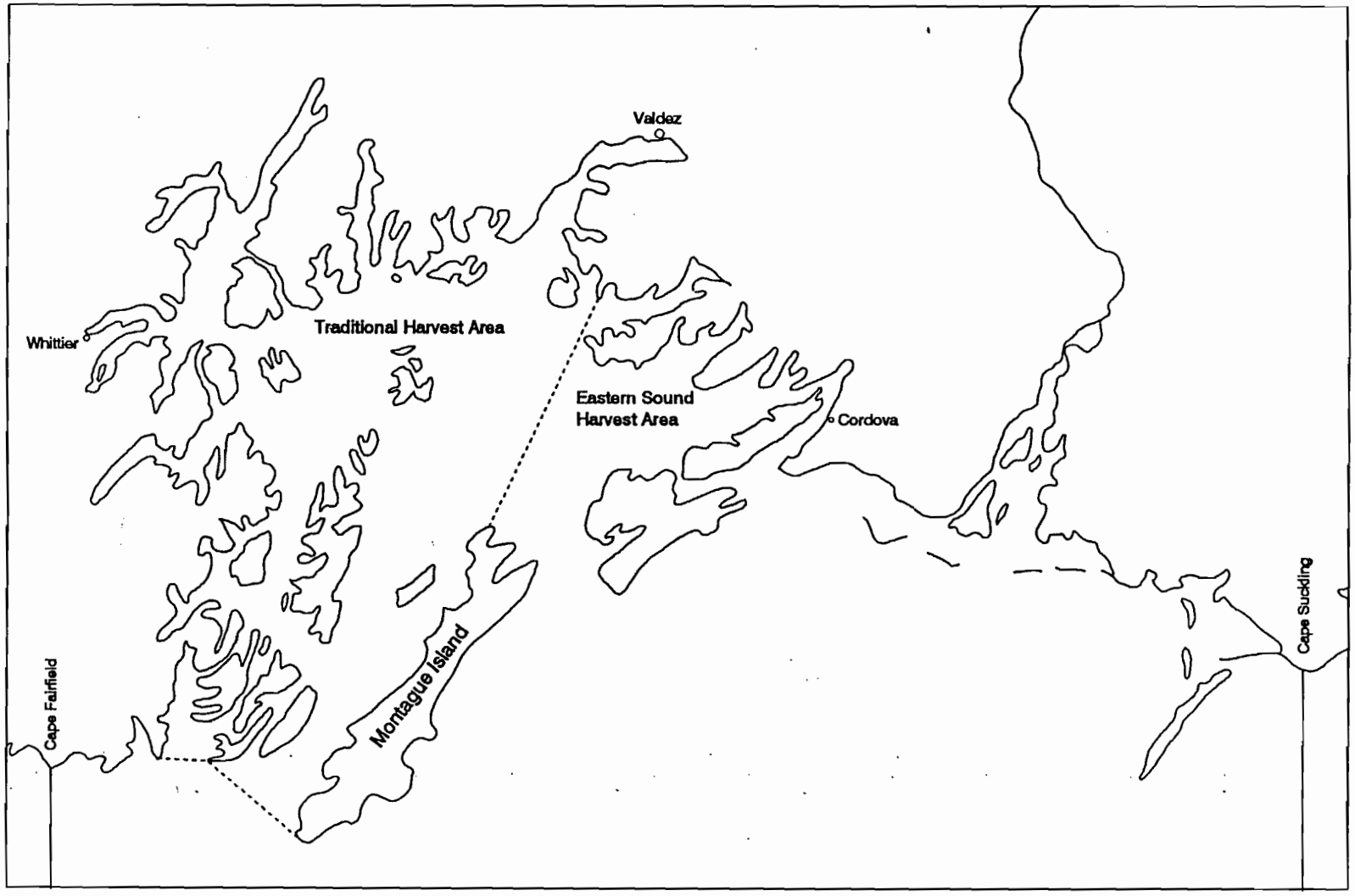

Figure 4. Prince William Sound pot shrimp management areas.

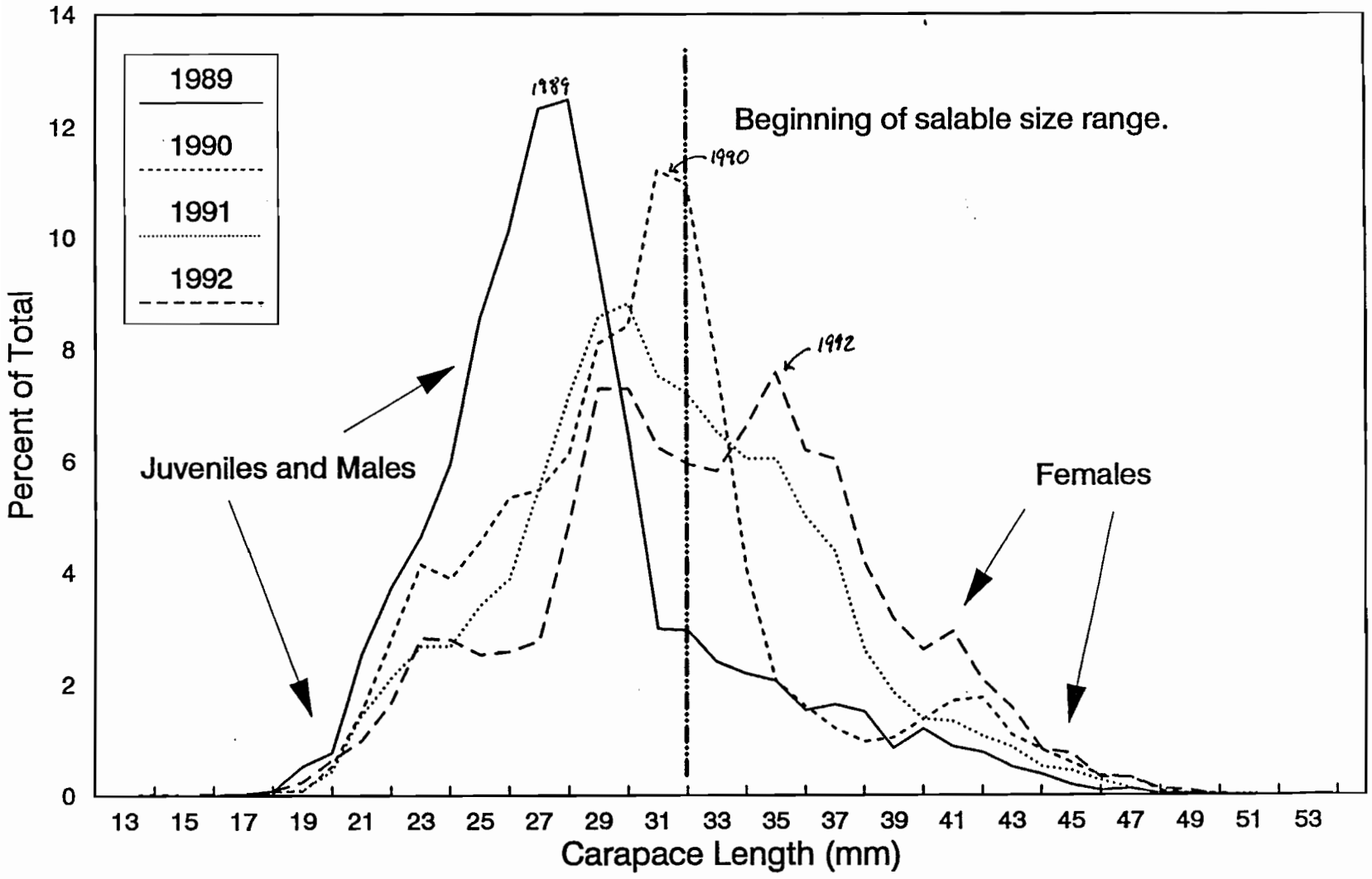

Figure 5. Comaparison of length frequencies of spot shrimp by percentage of the total captured during surveys in 1989 - 1992.

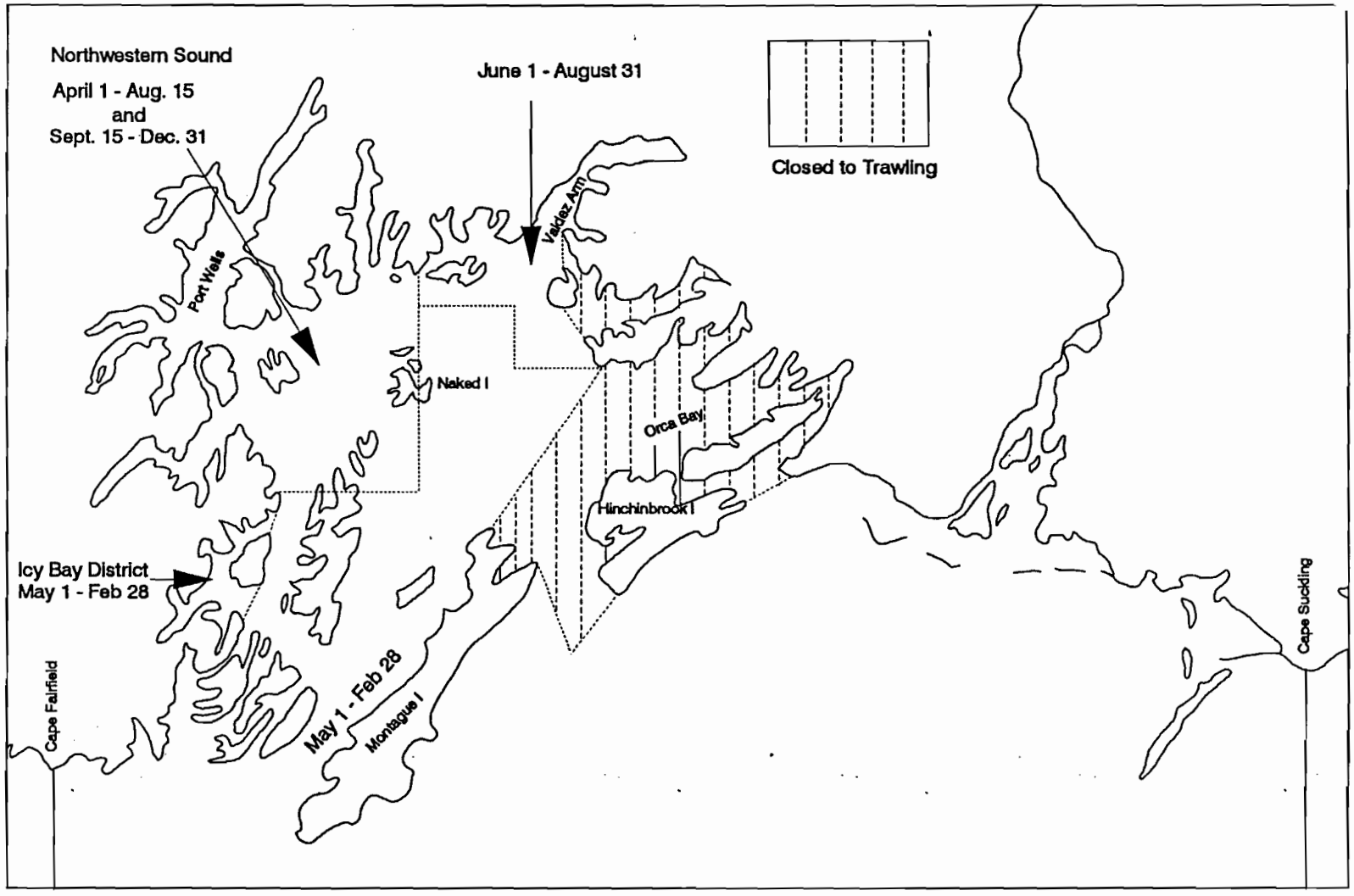

Figure 6. Prince William Sound trawl shrimp fishing areas and seasons.

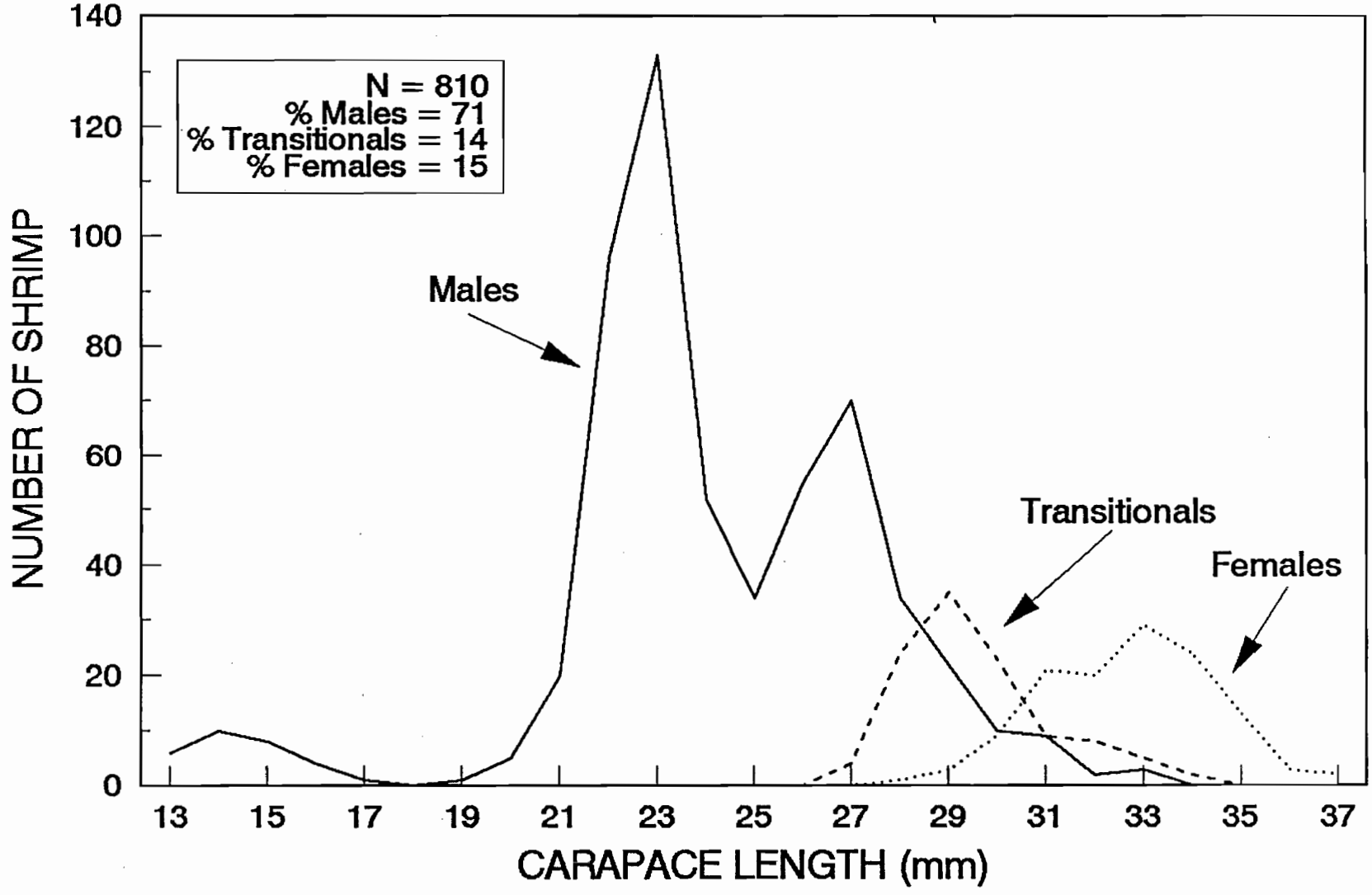

Figure 7. Length frequency of sidestripe shrimp from Port Wells shrimp trawl catch sampling in 1992.

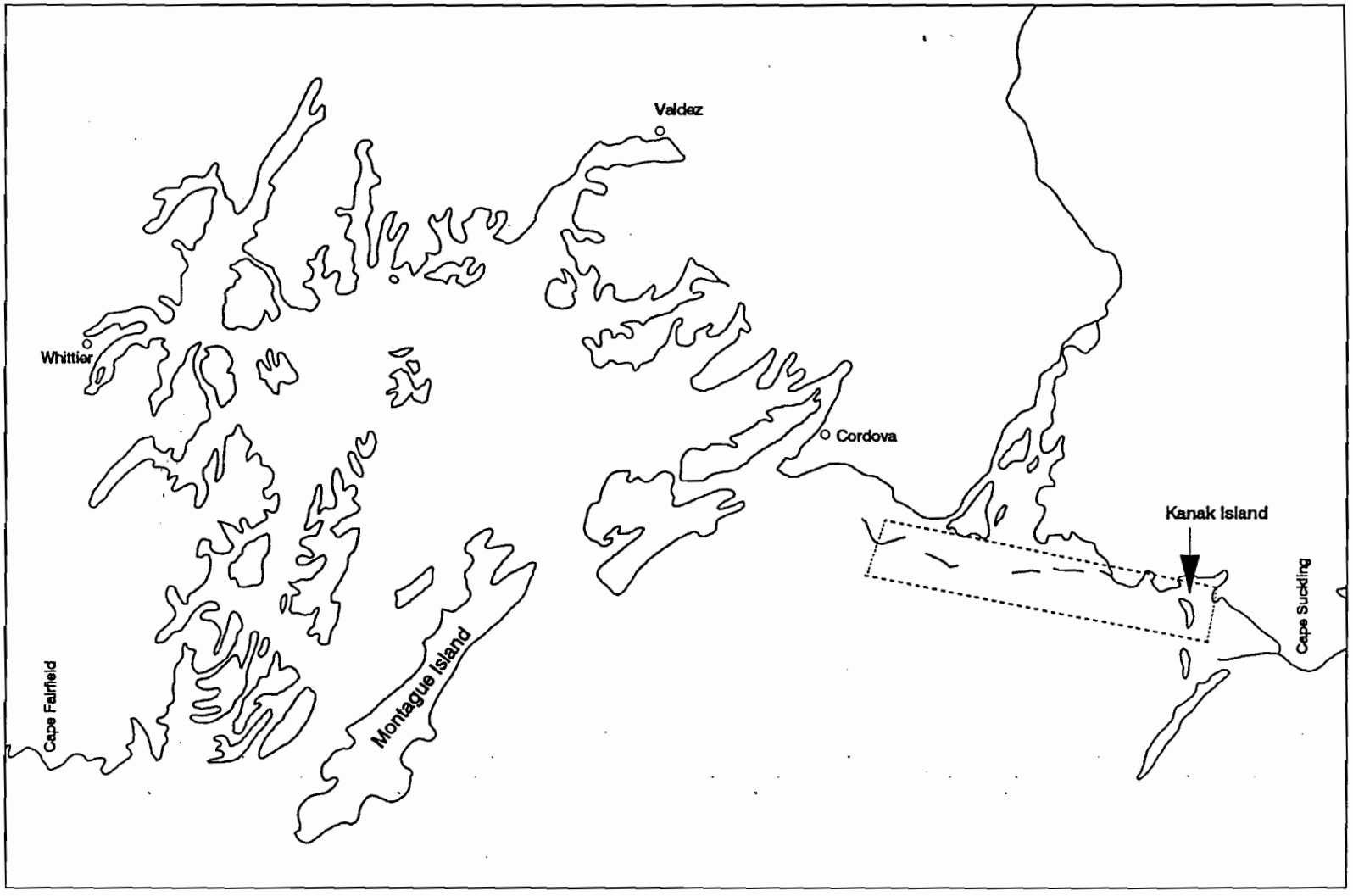

Figure 8. Copper River Delta razor clam harvest area.

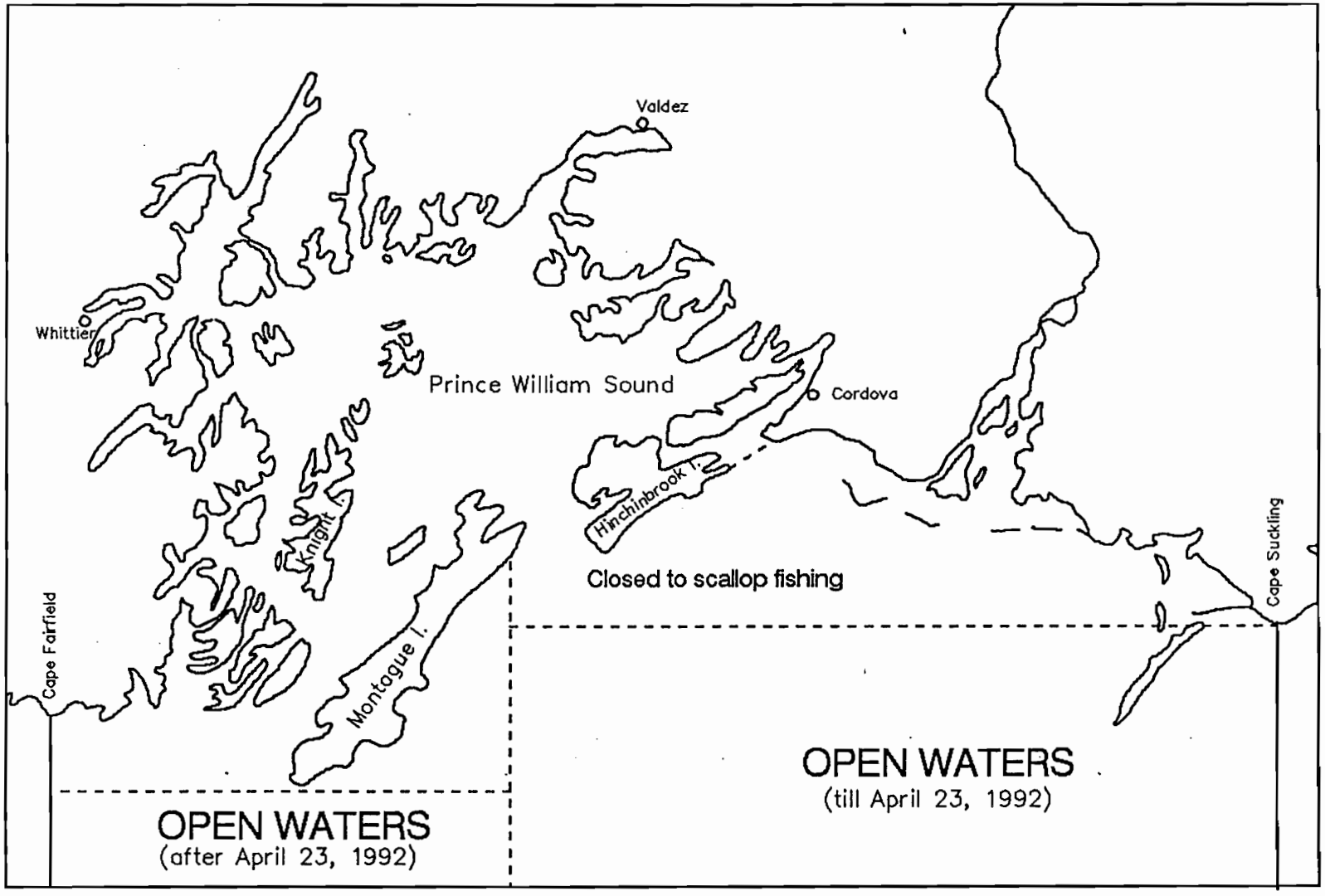

Figure 9. Prince William Sound scallop fishing areas in 1992.

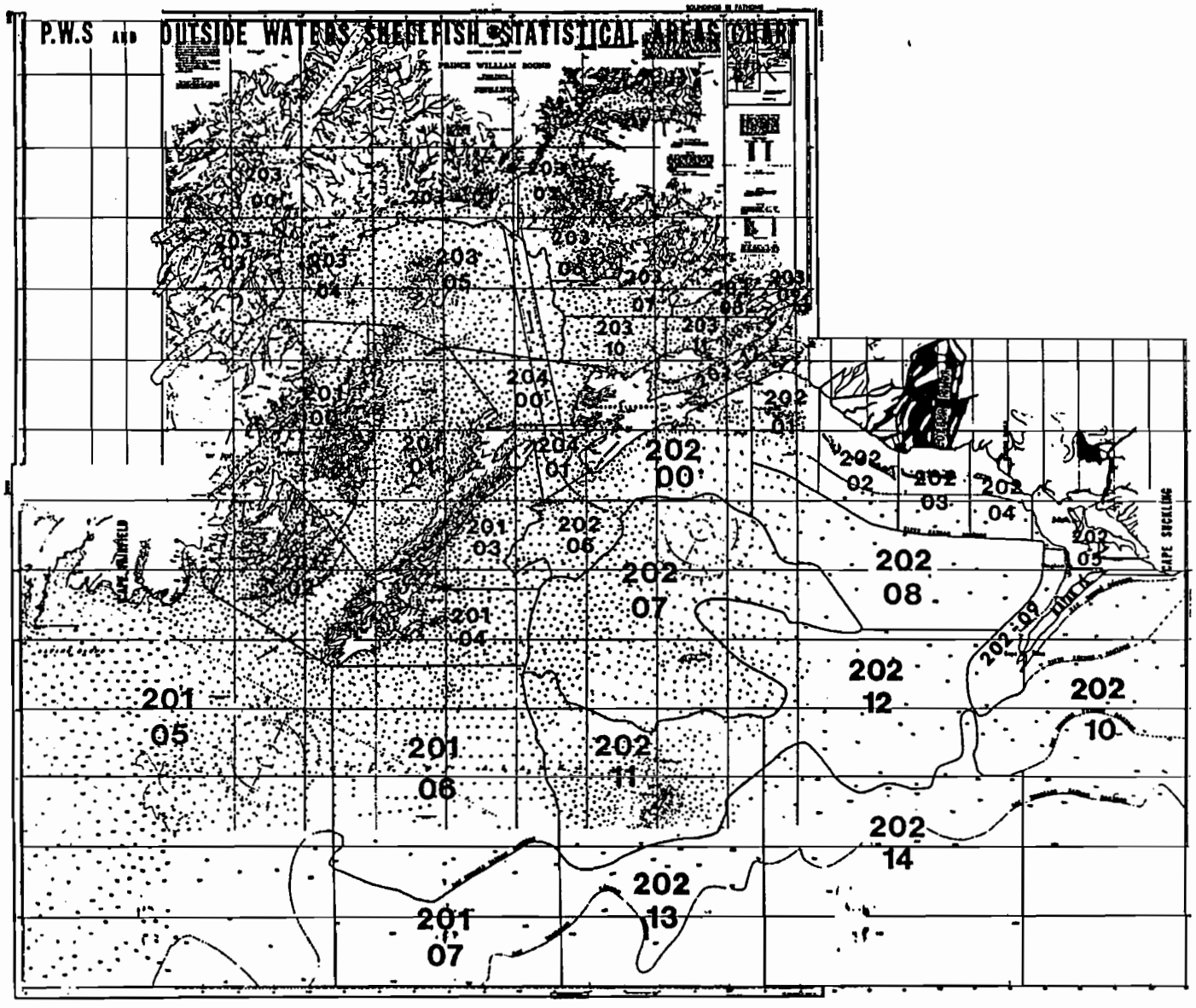

Figure 10. Prince William Sound Shellfish Statistical Area Chart.

Appendix A. Prince William Sound Area historical Tanner crab catch in pounds, by season 1968 – 1992.

Season	Inside	Outside	Total	Vessels	Lndgs.	% Recruit	Avg. Wt.	# Crab
1968–69			1,235,613					
1969–70			1,284,597					
1970–71			4,159					
1971–72			7,788,498					
1972–73			13,927,868					
1973–74	1,658,000	8,500,000	10,158,000					
1974–75	1,187,000	2,667,000	3,854,000					
1975–76	3,322,482	3,810,262	7,132,744					

	Northern	Hinchinbrook	Western	Eastern						
1976–77(1)	782,048	766,650	701,725	70,925	2,321,348	23	316			
1977–78	994,721	1,161,831	2,079,549	570,573	4,806,674	38	591		2.2	2,184,852
1978–79	649,977	708,562	2,248,545	3,443,471	7,050,555	51	783		2.1	3,357,408
1979–80	140,228	332,583	1,462,059	4,057,847	5,992,717	49	561		2.0	2,996,359
1980–81	152,196	812,352	1,561,207	250,076	2,775,831	30	304		2.1	1,321,824
1981–82	351,139	722,834	1,503,253	288,425	2,865,651	29	216		--	-----
1982–83	471,422	31,447	921,663	45,308	1,469,840	40	304		2.1	699,924
1984 (2)	Closed	Closed	Closed	No Effort	0	0	0	--	--	-----
1985	Closed	Closed	No Effort	No Effort	0	0	0	--	--	-----
1986	137,720	236,241	160,829	587	535,377	14	35	26	2.1	254,941
1987	152,834	222,052	196,246	0	571,132	23	65	51	2.1	271,968
1988	55,929	226,509	191,654	0	474,092	21	46	34	2.1	225,758
1989	Closed	Closed	Closed	Closed	0	0	0	--	--	-----
1990	Closed	Closed	Closed	Closed	0	0	0	--	--	-----
1991	Closed	Closed	Closed	Closed	0	0	0	--	--	-----
1992	Closed	Closed	Closed	Closed	0	0	0	--	--	-----

(1) New districts established and first season of the minimum legal size.

(2) Calendar year season established.

Appendix B. King crab catch, Prince William Sound Management Area, 1960 – 1993.

Year/Season	Pounds all species
1960	246,965
1961	236,081
1962	31,478
1963	43,569
1964	14,028
1965	5,500
1966	11,000
1967	41,800
1968	200,000
1969	48,100
1970	94,300
1971	144,200
1972	296,200
1973	207,916
1974	85,379
1975	53,423
1976–77	17,087
1977–78	86,595
1978–79	114,000

Seasons	Red	Blue	Brown	Avg. Wt. Brown	Total	Vessels	Landings
1979–80	52,026	13,662	0		65,688	18	109
1980–81	32,433	7,282	20		39,735	14	65
1981–82	25,358	5,634	0		30,992	11	43
1982–83	30,809	10,433	147,016	9.7	188,258	31	187
1983–84	16,467	5,324	50,535	8.8	73,226	18	69
1984–85	235	closed	40,232	--	40,467	4	14
1985–86	closed	closed	51,800	5.8	51,800	4	11
1986–87	closed	closed	65,674	6.1	65,837	4	11
1987–88	closed	closed	68,270	6.6	68,270	4	15
1988–89	closed	closed	48,442	6.6	48,442	5	14
1989–90	closed	closed	closed	--	0	0	0
1990–91	closed	closed	*	--	*	*	*
1991–92	*	*	*	--	*	*	*
1992–93	closed	closed	closed	--	0	0	0

(*) Harvest data is confidential due to the limited number of participants.

Appendix C. Prince William Sound Area Dungeness crab catch, 1960 – 1992.

Year	Copper River Pounds	Lndgs.	Vessels	# Crab	Avg. Wt.	Percent Recruits	Orca Inlet Pounds	Vessels	Northern District Pounds	Lndgs.	Vessels	Total Pounds
1960	—	—	—	—	—	—	1,524,326	—	—	—	—	1,524,326
1961	—	—	—	—	—	—	990,242	—	—	—	—	990,242
1962	—	—	—	—	—	—	1,353,190	—	—	—	—	1,353,190
1963	—	—	—	—	—	—	1,216,846	—	—	—	—	1,216,846
1964	—	—	—	—	—	—	1,290,929	—	—	—	—	1,290,929
1965	—	—	—	—	—	—	1,240,372	—	—	—	—	1,240,372
1966	—	—	—	—	—	—	999,341	—	—	—	—	999,341
1967	—	—	—	—	—	—	NO DATA AVAILABLE	—	—	—	—	NO DATA AVAILABLE
1968	—	—	—	—	—	—	579,279	—	—	—	—	579,279
1969	336,696	—	—	—	—	—	541,822	—	—	—	—	878,518
1970	78,223	—	—	—	—	—	660,411	—	—	—	—	738,634
1971	78,848	—	—	—	—	—	430,976	—	—	—	—	509,824
1972	437,865	—	—	—	—	—	286,808	—	—	—	—	724,673
1973	458,613	—	—	—	—	—	347,764	—	—	—	—	806,377
1974	290,149	—	—	—	—	—	269,015	—	—	—	—	559,164
1975	654,410	—	—	—	—	—	163,631	—	—	—	—	818,041
1976	254,933	—	4	—	—	—	35,399	3	—	—	—	290,332
1977	506,751	—	4	—	—	—	228,858	23	—	—	—	735,609
1978	1,319,451	—	12	—	—	—	648,439	34	49,571	—	17	2,053,461
1979	504,770	—	19	—	—	—	123,245	32	20,924	—	16	652,924
1980	659,667	—	10	—	—	—	CLOSED	—	31,152	—	5	690,819
1981	1,503,574	202	18	—	—	25	CLOSED	—	5,683	11	5	1,509,257
1982	757,911	139	16	332,417	2.2	26	CLOSED	—	4,221	4	2	762,182
1983	379,094	86	9	184,026	2.1	49	CLOSED	—	511	14	2	379,605
1984	826,778	88	10	413,394	2.0	92	CLOSED	—	150	2	2	826,938
1985	1,006,196	124	17	483,748	2.1	63	CLOSED	—	1,233	5	1	1,007,429
1986	1,090,477	105	16	531,940	2.1	58	CLOSED	—	0	—	—	1,090,477
1987	887,713	92	13	438,974	2.0	34	CLOSED	—	5,461	2	2	893,174
1988	602,969	48	8	298,569	2.0	52	CLOSED	—	0	—	—	602,969
1989	635,976	43	9	326,226	2.0	25	CLOSED	—	0	—	—	635,976
1990	397,913	63	17	196,266	2.0	36	CLOSED	—	0	—	—	397,913
1991	70,259	32	14	39,033	1.8	62	CLOSED	—	0	—	—	70,259
1992 (1)	*	*	*	*	*	*	CLOSED	—	0	—	—	*

(1) Spring season only.

* Harvest data is confidential due to the limited number of participants.

Appendix D. Pot shrimp harvest, Prince William Sound Management Area 1960 – 92.

Year	Vessels	Landings	Spot	Coonstripe	Other	Total [1] Whole Wt.
1960						4,988
1961						---
1962						3,576
1963						1,101
1964						4,248
1965						4,356
1966						---
1967						749
1968						6,866
1969						5,146
1970						19,776
1971						13,073
1972						6,949
1973						6,370
1974						24,978
1975						4,150
1976						2,410
1977						7,516
1978	9	17	N/A	N/A	N/A	15,466
1979	17	98	N/A	N/A	N/A	52,208
1980	23	155	84,787	5,174	67	90,028
1981	51	509	153,017	20,055	465	173,537
1982	57	397	205,746	7,250	784	213,781
1983	71	646	198,719	14,119	583	213,420
1984	79	513	198,729	7,911	640	207,280
1985	78	528	271,928	3,919	860	276,707
1986	80	540	286,105	3,715	812	290,632
1987	86	498	265,707	3,795	151	269,653
1988	76	433	191,630	764	48	192,442
1989	33	69	28,884	431	0	29,315
1990	23	59	36,378	358	0	36,737
1991	15	45	17,302	278	0	17,580
1992	C L O S E D					

[1] Catches converted from tail weight to whole weight using a conversion factor of 2.

Appendix E. Synopsis of the Prince William Sound pot shrimp fishery, Traditional Harvest Area season 1985 – 1992 (whole shrimp weight).

Year	# Vessels	# Landings	# Pounds	# Fishing Days
		SPRING SEASON		
1985	59	248	124,681	69
1986	51	252	108,911	73
1987	54	218	127,420	48
1988	56	213	104,347	38
1989	33	68	29,181	19
1990	23	59	36,737	24
1991	--[1]	--	--	--
1992	--	--	--	--
		FALL SEASON		
1985	43	202	90,618	67
1986	48	214	126,702	51
1987	54	223	109,638	38
1988	47	210	84,588	49
1989	--	--	--	--
1990	--	--	--	--
1991	15	44	17255	45
1992	--	--	--	--

[1] Season Closed

Appendix F. Trawl shrimp harvest, Prince William Sound Management Area 1972 – 1992.

Year	Vessels	Pounds
1972		5,153
1973		4,243
1974		1,345
1975		26,961
1976		134,115
1977		170,757
1978	8	440,684
1979	4	634,518
1980	6	557,328
1981	4	70,560
1982	9	346,517

Year	Vessels	Landings	Pink	Sidestripes	Other	Deadloss	Total
1983	13	46	420,275	1,058	2,345	—	423,678
1984	14	55	1,292,643	8,842	1,155	—	1,302,640
1985	6	44	432,514	15,696	440	—	448,650
1986	3	44	218,156	27,701	13	—	245,870
1987	2	109	275	95,043	440	—	95,758
1988	4	99	497	111,898	52	—	112,447
1989	*	*	*	*	*	—	*
1990	4	89	3,348	105,795	15	18,303	127,461
1991	5	67	3,453	84,483	193	51,429	139,558
1992	5	70	651	196,467	28	49,097	246,243

(*) Catch data is confidential due to the small number of participants.

Appendix G. Razor clam harvest in pounds, Prince William Sound Area, 1960 – 1992.

Year	COMMERCIAL Diggers	Pounds	NON – COMMERCIAL Diggers	Pounds
1960		433,930		
1961		261,628		
1962		208,698		
1963		86,340		
1964		39,275		
1965		86,477		
1966		27,063		
1967		98,446		
1968		72,806		
1969		26,887		
1970		27,909		
1971		37,972		
1972		30,326		
1973		30,318		
1974		29,747		
1975		15,443		
1976		1,516		
1977	11	2,160		
1978	54	29,865		
1979	26	12,904		
1980	21	5,881		
1981	7	28,970		
1982	12	15,275		
1983	41	124,835		
1984	41	168,426		
1985	25	60,274	37	4,930
1986	17	13,122	38	4,831
1987	12	40,954	83	6,225
1988	4	6,766	52	2,768
1989	No Effort	0	50	2,903
1990	"	0	50	2,641
1991	"	0	77	1,484
1992	"	0	92	2,403

1. A permit is required to harvest razor clams from the Copper River Delta for personal use, sport, or subsistence.